Claims

1. (currently amended) A process for coating a substrate with an organic thin film, comprising:

placing a three-dimensional substrate in a vacuum chamber;

preparing a mixture of at least one volatile liquid and at least one organic compound;

metering the mixture into a calibrated dispense volume;

evacuating the vacuum chamber;

purging the vacuum chamber with an inert gas;

bringing the level of pressure in the vacuum chamber to a controlled pressure;

introducing the mixture into the chamber through an ultrasonic nozzle~~, wherein a~~ to form a cloud of micro-droplets ~~form and~~ that isotropically impact on the substrate~~, and wherein~~ and coat the substrate ~~is coated~~ with ~~an~~ a generally conformal organic thin film; and

drying the organic thin film.

2. (previously presented) The process of claim 1, wherein the step of drying includes purging the chamber with an inert gas.

3. (previously presented) The process of claim 1, wherein the substrate is a stent.

4. (previously presented) The process of claim 3, wherein the stent is coated with a restenosis inhibiting layer.

5. (withdrawn) The process of claim 1, wherein the substrate is a SAWS.

6. (withdrawn) The process of claim 5, wherein the SAWS is coated with an organic compound that captures a particular hazardous compound.

7. (withdrawn) An ultrasonic nozzle assembly for atomizing a liquid and directing a separate source of gas around the nozzle for purging of a vacuum chamber with the source of gas, comprising:

a feed line comprising a coupling end an output section end, wherein a liquid passage axially extends from the coupling end through the feed line and out of the output section end;

a front ultrasonic horn section;

a rear ultrasonic horn section;

at least one piezoelectric element, wherein the at least one piezoelectric element is sandwiched between the front horn section and the rear horn section;

an output section extending from the front ultrasonic horn section and terminating in an atomizing surface, wherein the feed line output section end couples with the output section, wherein the output section end of the feed line and the output section form a metal to metal seal, wherein a liquid passage axially extends through the output section, through the front horn section and the rear horn section to the coupling end of the feed line;

a coupling to the source of gas;

a housing, wherein the housing encloses the rear horn section and the piezoelectric element, and wherein the housing couples with the feedline, the output section, the source of gas and the vacuum chamber to form a vacuum seal, and wherein the housing comprises a gas passageway, a gas coupling, and a gas outlet, wherein the housing directs the source of gas around the ultrasonic nozzle and past the output section for purging of the vacuum chamber with the source of gas.

8. (currently amended) A process for coating a substrate with an organic thin film, comprising:

placing a three-dimensional substrate in a vacuum chamber;

preparing an organic liquid;

metering the organic liquid into a calibrated dispense volume;

evacuating the vacuum chamber;

purging the vacuum chamber with a gas;

bringing the level of pressure in the vacuum chamber to a controlled pressure;

introducing the organic liquid into the chamber through an ultrasonic nozzle~~,~~ ~~wherein~~ to form a cloud of micro-droplets ~~form, and~~that isotropically impact on the substrate~~, and wherein~~ and coat the substrate ~~is coated~~ with ~~an~~ a generally conformal organic thin film ~~that is a product of a reaction involving the organic liquid~~; and

drying the organic thin film.

9. (previously presented) The process of claim 8, wherein the organic liquid is hydroxy-functionalized silane.

10. (withdrawn) An apparatus for coating a substrate with an organic thin film, comprising:

a vacuum chamber, wherein the substrate is disposed within the vacuum chamber;

a vacuum pump;

a vacuum valve, wherein the vacuum valve connects the vacuum chamber to the vacuum pump and wherein the vacuum valve selectively opens and closes;

at least one ultrasonic nozzle, having an inlet and an outlet disposed in a vacuum chamber, wherein the outlet extends into the vacuum chamber;

a calibrated dispense volume;

at least one source of a mixture of at least one volatile liquid and at least one organic compound;

a first valve, wherein the first valve selectively connects the at least one source to the calibrated dispense volume;

a second valve, wherein the second valve selectively connects the calibrated dispense volume to the ultrasonic nozzle;

at least one source of an inert gas;

at least one gas valve, wherein the at least one gas valve connects the at least one source of inert gas to the vacuum chamber; and

a process control system, wherein the process control system controls the vacuum pressure of the vacuum chamber by actuating the vacuum valve and the at least one gas valve, and wherein the process control system sequentially actuates the first and second valves, wherein a metered amount of the mixture contained in the at least one source is introduced into the calibrated dispense volume through the first valve, and is then supplied to the inlet end of said ultrasonic nozzle by said second valve, wherein the ultrasonic nozzle introduces the mixture into the vacuum chamber, whereby the a cloud of microdroplets is produced, whereby the micro-droplets in the cloud isotropically impact on the substrate, whereby the substrate is coated with an organic thin film.

11. (currently amended) A process for coating a substrate with an organic compound in a vacuum chamber, comprising the steps of:

introducing a mixture of a liquid and the organic compound into the chamber via an ultrasonic nozzle in the form of micro-droplets so that the micro-droplets impact isotropically on ~~the~~ a three-dimensional substrate to generally conformally coat the substrate with the mixture; and

evaporating the liquid from the coated substrate.

12. (previously presented) The process according to claim 11, further comprising the step of controlling a pressure in the chamber to a controlled pressure during the introducing step.

13. (previously presented) The process according to claim 12, wherein the liquid is volatile at the controlled pressure.

14. (previously presented) The process according to claim 11, wherein the evaporating step includes the substep of purging the chamber with an inert gas.

15. (currently amended) The process according to claim 11, wherein the three-dimensional substrate includes a stent.

16. (cancelled)

17. (withdrawn) An ultrasonic nozzle assembly, comprising:

a front ultrasonic horn setion;

a rear ultrasonic horn section;

a piezoelectric element arranged between the front horn section and the rear horn section;

an output section extending from the front ultrasonic horn section to an atominzing surface; and

passageway configured to connect a source of gas to a gas outlet separate from the output section.

18. (withdrawn) An apparatus for coating a substrate with an organic compound, comprising:

a vacuum chamber;

a source of a mixture of a liquid and the organic compound;

an ultrasonic nozzle configured and arranged to introduce the mixture of the liquid and the organic compound into the chamber in the form of micro-droplets so that the micro-droplets impact on the substrate to coat the substrate with the mixture; and

an arrangement configured to evaporate the liquid from the coated substrate.

19. (withdrawn) The apparatus according to claim 18, wherein the substrate includes a stent.

20. (withdrawn) The apparatus according to claim 18, wherein the arrangement includes controllable source of an inert gas.

21. (withdrawn) The apparatus according to claim 18, further comprising an arrangement configured to control a pressure in the chamber to a controlled pressure.

22. (withdrawn) The apparatus according to claim 21, wherein the liquid is volatile at the controlled pressure.

23. (withdrawn) The apparatus according to claim 18, wherein the nozzle is configured and arranged to introduce the mixture so that the micro-droplets isotropically impact on the surface.